CLAIMS

What is claimed is:

1. An electromagnetic radiation-absorbing particle comprising:

(a) a core; and

(b) a shell,

wherein the shell encapsulates the core; and

wherein either the core or the shell comprises a conductive material,

said material having a negative real part of the dielectric constant in a predetermined spectral band; and

wherein either

(i) the core comprises a first conductive material and the shell comprises a second conductive material different from the first conductive material;

or

(ii) either the core or the shell comprises a refracting material with a refraction index greater than about 1.8.

2. The particle of claim 1 wherein said particle exhibits an absorption cross-section greater than 1 in a predetermined spectral band.

3. The particle of claim 1 wherein the particle is substantially spherical.

4. The particle of claim 3 wherein the particle has a diameter from about 1 nm to about 300 nm.

5. The particle of claim 3 wherein the particle has a diameter from about 10 nm to about 50 nm.

6. The particle of claim 1 wherein the shell thickness is from about 0.1 nm to about 20 nm.

7. The particle of claim 1 wherein either the core or the shell material is selected from a group consisting of Ag, Al, Mg, Cu, Ni, Cr, TiN, ZrN, HfN, Si, ZrO_2, and TiO_2.

8. The particle of claim 1 wherein both the core and the shell comprise conductive materials, and wherein the materials of the core and the shell are selected so that the particle exhibits a peak of absorption in a range of wavelengths from about 350 nm to about 450 nm.

9. The particle of claim 1 wherein both the core and the shell comprise conductive materials, and wherein the materials of the core and the shell are selected so that the particle exhibits a peak of absorption in a range of wavelengths from about 450 nm to about 500 nm.

10. The particle of claim 1 wherein both the core and the shell comprise conductive materials, and wherein the materials of the core and the shell are selected so that the particle exhibits a peak of absorption in a range of wavelengths from about 450 nm to about 500 nm.

11. The particle of claim 1 wherein both the core and the shell comprise conductive materials, and wherein the materials of the core and the shell are selected so that the particle exhibits a peak of absorption in a range of wavelengths from about 500 nm to about 550 nm.

12. The particle of claim 1 wherein both the core and the shell comprise conductive materials, and wherein the materials of the core and the shell are selected so that the particle exhibits a peak of absorption in a range of wavelengths from about 550 nm to about 600 nm.

13. The particle of claim 1 wherein both the core and the shell comprise conductive materials, and wherein the materials of the core and the shell are selected so that the particle exhibits a peak of absorption in a range of wavelengths from about 600 nm to about 650 nm.

14. The particle of claim 1 wherein both the core and the shell comprise conductive materials, and wherein the materials of the core and the shell are selected so that the particle exhibits a peak of absorption in a range of wavelengths from about 650 nm to about 700 nm.

15. The particle of claim 1 wherein either the core or the shell comprises a refracting material with a refraction index greater than about 1.8, and wherein thickness of the shell and/or the size of the core are independently adjusted so that the particle exhibits a peak of absorption in a range of wavelengths from about 350 nm to about 450 nm.

16. The particle of claim 1 wherein either the core or the shell comprises a refracting material with a refraction index greater than about 1.8, and wherein thickness of the shell and/or the size of the core are independently adjusted so that the particle exhibits a peak of absorption in a range of wavelengths from about 450 nm to about 500 nm.

17. The particle of claim 1 wherein either the core or the shell comprises a refracting material with a refraction index greater than about 1.8, and wherein thickness of

the shell and/or the size of the core are independently adjusted so that the particle exhibits a peak of absorption in a range of wavelengths from about 500 nm to about 550 nm.

18. The particle of claim 1 wherein either the core or the shell comprises a refracting material with a refraction index greater than about 1.8, and wherein thickness of the shell and/or the size of the core are independently adjusted so that the particle exhibits a peak of absorption in a range of wavelengths from about 550 nm to about 600 nm.

19. The particle of claim 1 wherein either the core or the shell comprises a refracting material with a refraction index greater than about 1.8, and wherein thickness of the shell and/or the size of the core are independently adjusted so that the particle exhibits a peak of absorption in a range of wavelengths from about 600 nm to about 650 nm.

20. The particle of claim 1 wherein either the core or the shell comprises a refracting material with a refraction index greater than about 1.8, and wherein thickness of the shell and/or the size of the core are independently adjusted so that the particle exhibits a peak of absorption in a range of wavelengths from about 650 nm to about 700 nm.

21. A method of manufacturing a particle that absorbs a particular range of radiation comprising the step of encapsulating a core with a shell, wherein either the core or the shell comprises a conductive material, said material having a negative real part of the dielectric constant in a predetermined spectral band; and wherein either

(i) the core comprises a first conductive material and the shell comprises a second conductive material different from the first conductive material; or

(ii) either the core or the shell comprises a refracting material with a refraction index greater than about 1.8.

22. The method of claim 21 wherein the core comprises a first conductive material and the shell comprises a second conductive material different from the first conductive material, and wherein the first and the second conducting materials are selected so that the particle exhibits a peak of absorption in a desired spectral band.

23. The method of claim 21 wherein either the core or the shell comprises a refracting material with a refraction index greater than about 1.8, and wherein the thickness of the shell is selected so that the particles exhibits a peak of absorption in a desired spectral band.

24. An electromagnetic radiation-absorptive material for substantially blocking passage of a selected spectral band of radiation comprising:

(a) a carrier material; and

(b) a particulate material dispersed in the carrier material with a primary particle comprising a core and a shell encapsulating said core, and wherein either the core or the shell comprises a conductive material, said material having a negative real part of the dielectric constant in a predetermined spectral band; and

wherein either

(i) the core comprises a first conductive material and the shell comprises a second conductive material different from the first conductive material; or

(ii) either the core or the shell comprises a refracting material with a refraction index greater than about 1.8.

25. The material of claim 24 wherein the carrier is selected from the group consisting of glass, polyethylene, polypropylene, polymethylmethacrylate, polystyrene, and copolymers thereof.

26. The material of claim 24 further comprising one or more distinct particulate materials.

27. The material of claim 24 wherein the material is ink.

28. The material of claim 24 wherein the material is paint.

29. The material of claim 24 wherein the material is lotion.

30. The material of claim 24 wherein the material is gel.

31. The material of claim 24 wherein the material is film.

32. The material of claim 24 wherein the material is solid.

33. The material of claim 24 wherein the primary particle is covalently attached to a molecule selected from a group consisting of peptides, nucleic acids, saccharides, lipids, and small molecules.

34. The material of claim 24 wherein the primary particles are further embedded in beads.

35. The material of claim 34 wherein the primary particles are individually embedded in substantially spherical beads.